

For the scenario below identify the entities, their attributes and appropriate keys

### **The Angel Warehouse**

The Angel Warehouse stores items for its parent company. The warehouse is organised into bays, which are storage areas, but the items themselves are stored in bins. Each bay contains a number of bins. Each bay is identified by a unique bay number and the bay location and the height of the bay are recorded. Each bin has a different number within the bay, always starting with bin no. 1, and while some bays have only 5 bins some have over 50. The size of each bin is recorded.

Some bays have a parking spot for one fork lift to help move items round the warehouse and lift items into bins. Each fork lift is allocated to a bay. Each fork lift has a unique equipment number and the maximum carrying weight of the fork lift needs to be known. Some fork lifts are petrol driven while some are electric.

For all bins the maximum loaded weight must be known.

When an item is taken into the warehouse it is assigned a unique number and the date is recorded as well as the item weight. Bins can store a number of items and when an item is put in a particular bin this date is also recorded. Items can be moved back and forth between bays and bins to optimise the warehouse storage.

#### **Bays**

Bay\_Num (Primary key) = 101

Bay\_Location = WarehouseA

Bay\_Height = 10meters

Num\_Bins (optional can be derived from bin) = 5

#### **Bin**

Bin\_Num (Part of composite key) = 1

Bay\_Num (Part of composite key) = 101

Bin\_Size = Medium

Max\_Load = 500kg

#### **Forklift**

Fork\_Number (Primary key) = F1001

Bay\_Num (Foreign key) = 101

Max\_Weight = 1500kg

Fork\_Type = Electric

#### **Item**

Item\_Num (Primary key) = I001

Item\_Date = 01/01/2024

Item\_Weight = 100kg

Bin\_Num (Foreign key) = 1

Bay\_Num (Foreign key) = 101

Bin\_Date = 10/01/2024

Optional additional table (if tracking movements):

**Item\_Movement**

Item\_Num = I001

Old\_Bin\_Num (Part of composite foreign key) = 1

Old\_Bay\_Num (Part of composite foreign key) = 101

New\_Bin\_Num (Part of composite foreign key) = 2

New\_Bay\_Num (Part of composite foreign key) = 102

Move\_Date = 15/01/2024

**Example queries** (Minimum 5 – list, who, which, how many, most, fewest etc. - check that you have listed the attributes needed to answer your queries)

- 1) How many items can be held at Bin\_Num: 1 without exceeding the Max\_Load?
- 2) How many times has item I001 been moved between bins and bays?
- 3) Are there more bays and bins in WarehouseA than in WarehouseB?
- 4) What is the average weight of an item withing WarehouseA?
- 5) What is the electric forklift to petrol forklift ratio within WarehouseA and WarehouseB?
- 6) Which bays are currently meeting their Max\_Load?
- 7) Which warehouse has the fewest number of bays and bins?
- 8) On which day did the most item movements occur on?